

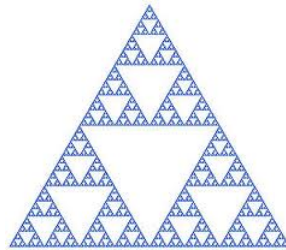
Chapter 5 Angles, Similarity, Transformations

5.4 Lesson Using Similar Triangles

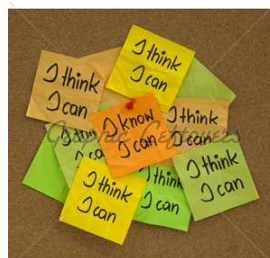
Unit Question: How do we create from investigating similarities and differences?

Learner Profile: Reflective

Area of Interaction: Human Ingenuity



I Can Statement:
I can understand and use similar triangles.



5.4 Lesson

Check It Out
Lesson Tutorials
BigIdeasMath.com

Key Vocabulary

similar triangles,
p. 208
indirect measurement,
p. 209

Triangles that have the same shape but not necessarily the same size are **similar triangles**.



Key Idea

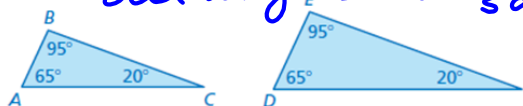
$\triangle ABC \sim \triangle DEF$

Angles of Similar Triangles

Words Two triangles have the same angle measures if and only if they are similar.

all angles are the same

Example



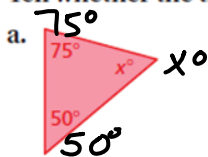
Triangle ABC is similar to triangle DEF: $\triangle ABC \sim \triangle DEF$.

Study Tip

If two angles in one triangle are congruent to two angles in another triangle, then the third angles are also congruent.

EXAMPLE 1 Identifying Similar Triangles

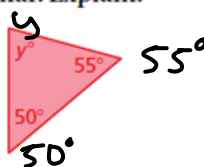
Tell whether the triangles are similar. Explain.



$$75 + 50 + x = 180$$

$$125 + x = 180$$

$$x = 55$$



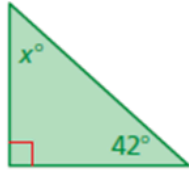
$$y + 50 + 55 = 180$$

$$y + 105 = 180$$

$$y = 75$$

✧ The triangles have the same angle measures, 75° , 50° , and 55° . So, they are similar.

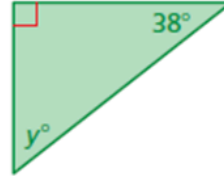
b.



$$x + 90 + 42 = 180$$

$$x + 132 = 180$$

$$x = 48$$



$$90 + 38 + y = 180$$

$$128 + y = 180$$

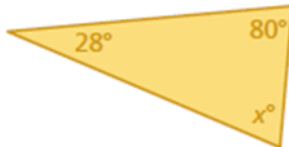
$$y = 52$$

❖ The triangles do not have the same angle measures.
So, they are not similar.

● On Your Own

Tell whether the triangles are similar. Explain.

1.



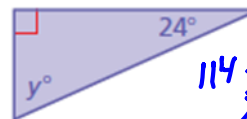
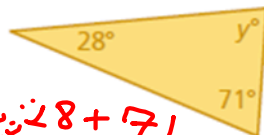
2.



$$90 + 66 + x = 180$$

$$156 + x = 180$$

$$x = 24^\circ$$



$$90 + 24 + y = 180$$

$$114 + y = 180$$

$$y = 66^\circ$$

$$\begin{aligned} 28 + 80 &= 108 \\ 108 + x &= 180 \\ x &= 72 \end{aligned}$$

$$\begin{aligned} 28 + 71 &= 99 \\ 99 + y &= 180 \\ y &= 81 \end{aligned}$$

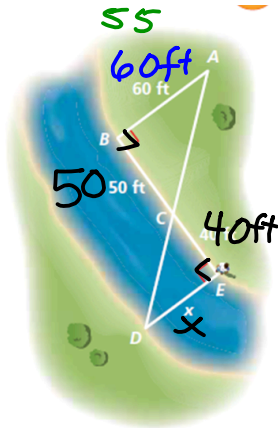
No

yes

Indirect measurement uses similar figures to find a missing measure when it is difficult to find directly.

2 Using Indirect Measurement

You plan to cross a river and want to know how far it is to the other side. You take measurements on your side of the river and make the drawing shown. (a) Explain why $\triangle ABC$ and $\triangle DEC$ are similar. (b) What is the distance x across the river?



$$\frac{x}{60} = \frac{40}{50} \quad x = 48$$

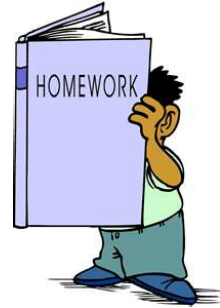
What if? If the distance from vertex A to vertex B is 55 feet, what is the distance across the river?

$$\frac{x}{55} = \frac{40}{50} \quad \begin{array}{r} 55 \\ \times 40 \\ \hline 2200 \\ \div 50 \\ \hline 50 \end{array}$$

I Can Statement:
I can understand and use similar triangles.



Assignment:



p. 210-211

1-2,7-9,12-13,15